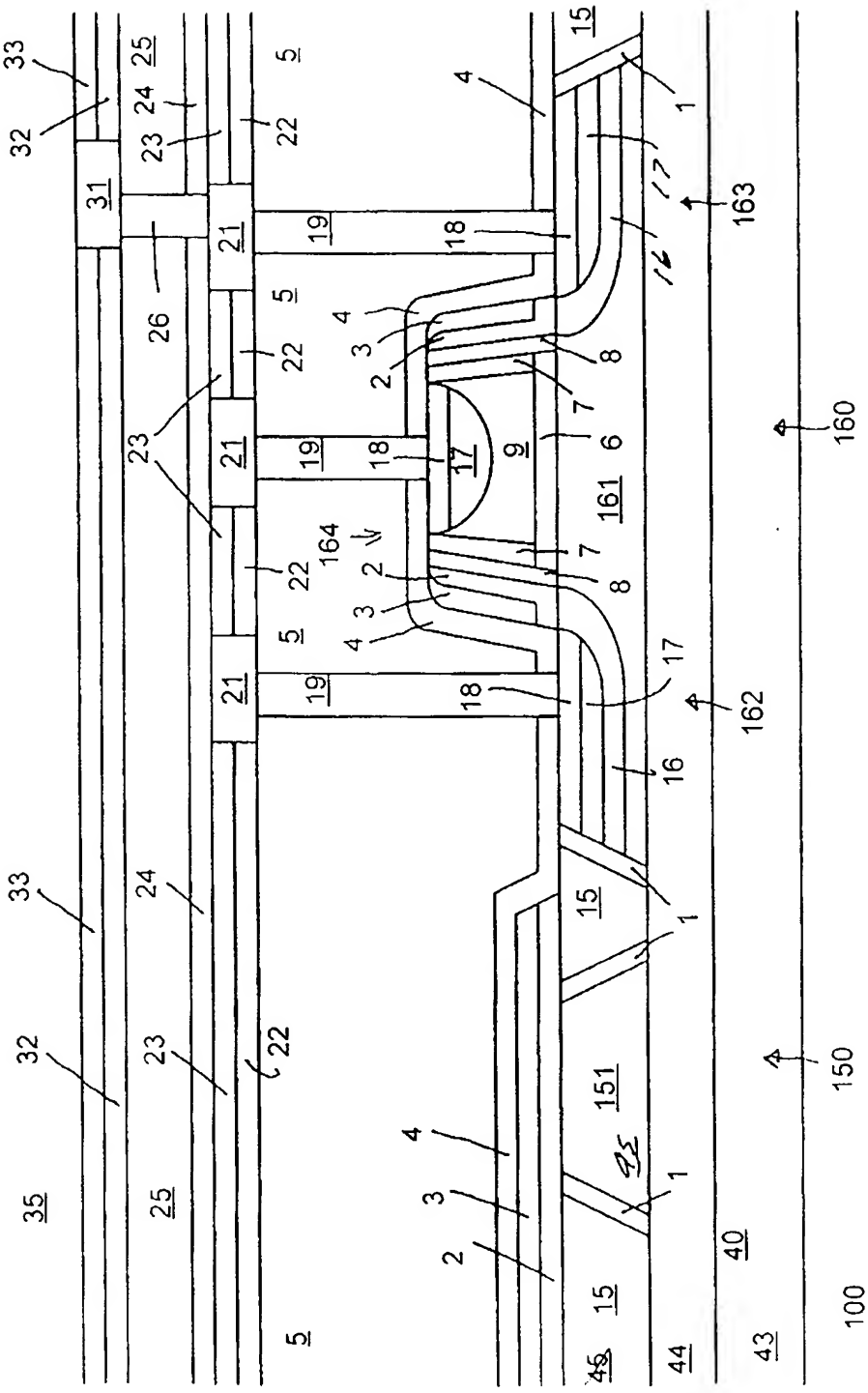

FIGURE 1

CROSS SECTIONAL VIEW
SILICON WG AND TRANSISTOR ON SOI

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE IN FIGURE 1	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	151	Core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	2	Oxide spacer	2	Cladding
Si3N4	3	Salicide block	3	Cladding
SiO2	4	Contact punch-through	4	Cladding
SiO2	5	Inter-layer dielectric (ILD)	5	Cladding

FIGURE 1A

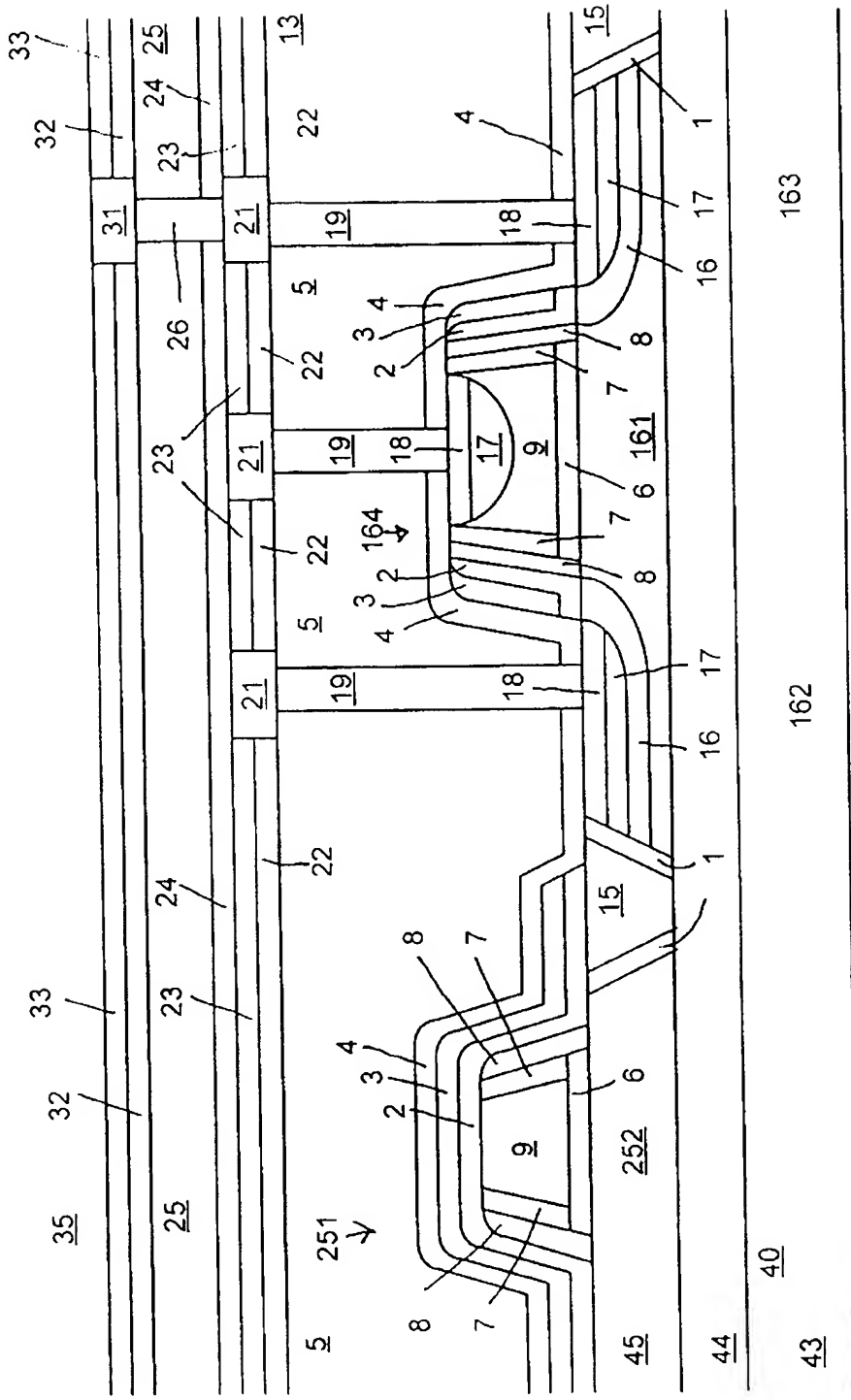
CROSS SECTIONAL VIEW
POLY STRIP LOADED WG AND TRANSISTOR ON SOI

FIGURE 2

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE IN FIGURE 2	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	252	Portion of core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	6	Gate oxide	6	Portion of core
Poly	9	Gate	9	Portion of core
SiO2	7	Sidewall passivation	7	Cladding
SiO2	9	Part of gate spacer	8	Cladding
SiO2	2	Oxide spacer	2	Cladding
Si3N4	3	Salicide block	3	Cladding
SiO2	1	Contact punch-through	4	Cladding
SiO2	5	Inter-layer dielectric (ILD)	5	Cladding

FIGURE 2A

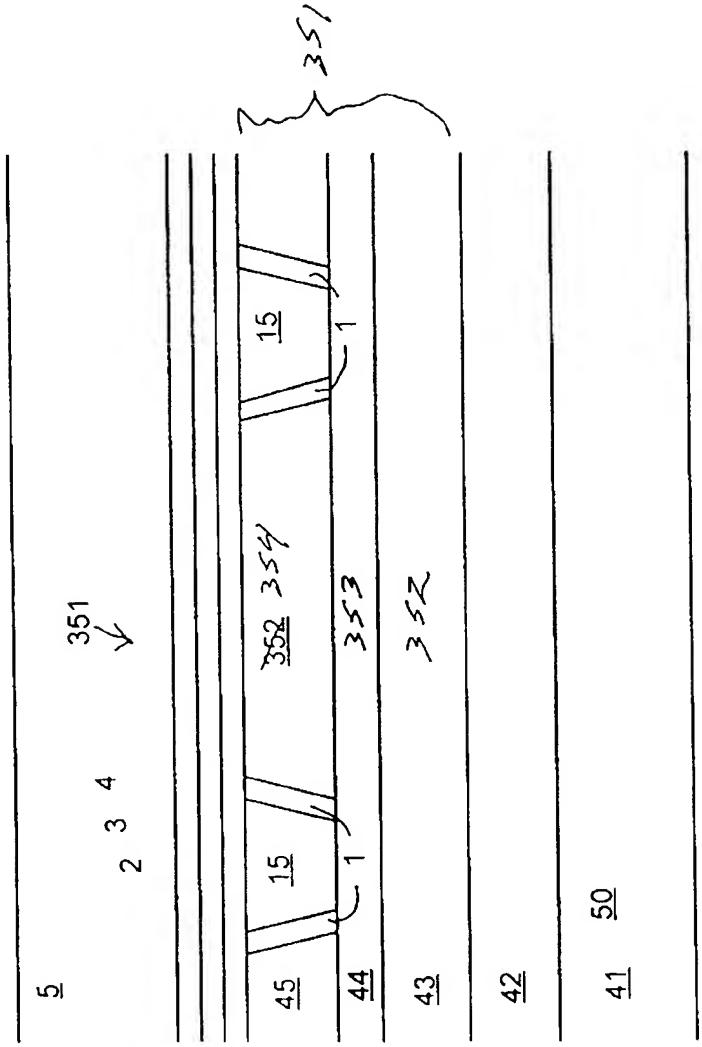

FIGURE 3

CROSS SECTIONAL VIEW
SILICON STRIP LOADED WG
ON DOUBLE LAYER

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE IN FIGURE 3	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	353	Portion of core
Silicon (45)	161	Body of transistor	354	Portion of core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	2	Oxide spacer	2	Cladding
Si3N4	3	Salicide block	3	Cladding
SiO2	4	Contact punch-through	4	Cladding
SiO2	5	Inter-layer dielectric (ILD)	5	Cladding

FIGURE 3A

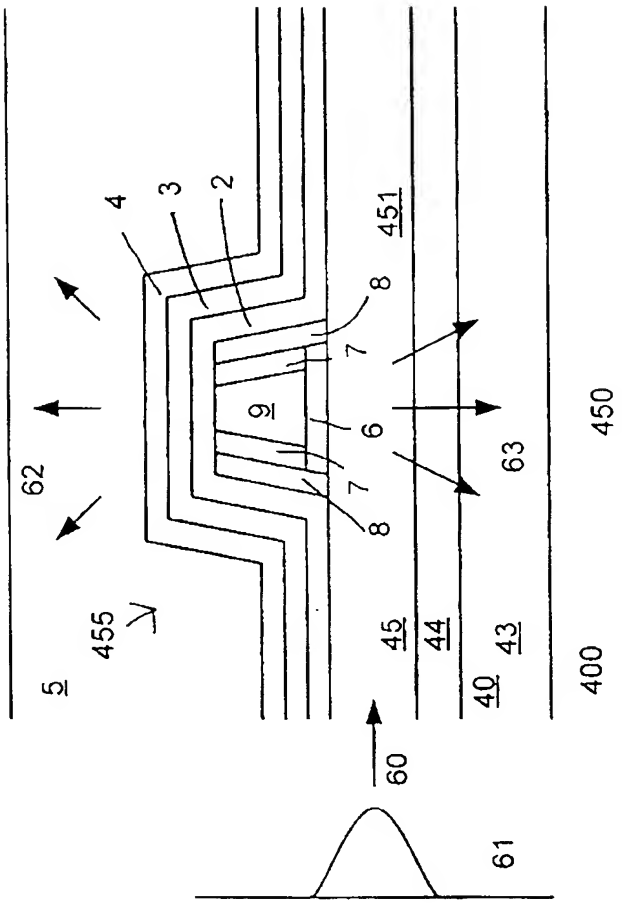

FIGURE 4

SIDE VIEW
SILICON WG ON SOI
WITH POLY SCATTERING ELEMENT

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 4	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	451	Core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	6	Gate oxide	6	Part of cladding and light scattering element
Poly	9	Gate	9	"
SiO2	7	Sidewall passivation	7	"
SiO2	8	Part of gate spacer	8	"
SiO2	2	Oxide spacer	2	"
Si3N4	3	Salicide block	3	"
SiO2	4	Contact punch-through	4	"
SiO2	5	Inter-layer dielectric (ILD)	5	"

FIGURE 4A

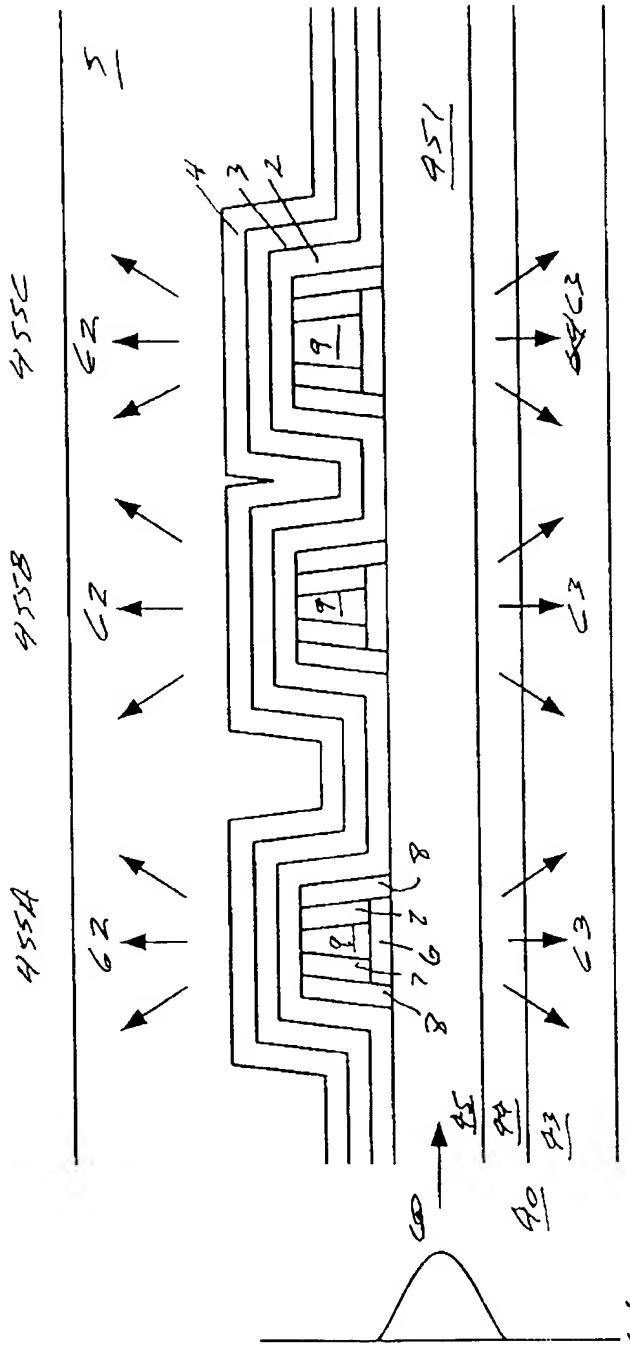

FIGURE 5

SIDE VIEW
SILICON WG ON SOI
WITH POLY GRATING

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENTS IN FIGURE 5	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	451	Core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	6	Gate oxide	6	Part of cladding and light scattering elements
Poly	9	Gate	9	"
SiO2	7	Sidewall passivation	7	"
SiO2	8	Part of gate spacer	8	"
SiO2	2	Oxide spacer	2	"
Si3N4	3	Salicide block	3	"
SiO2	4	Contact punch-through	4	"
SiO2	5	Inter-layer dielectric (ILD)	5	"

FIGURE 5A

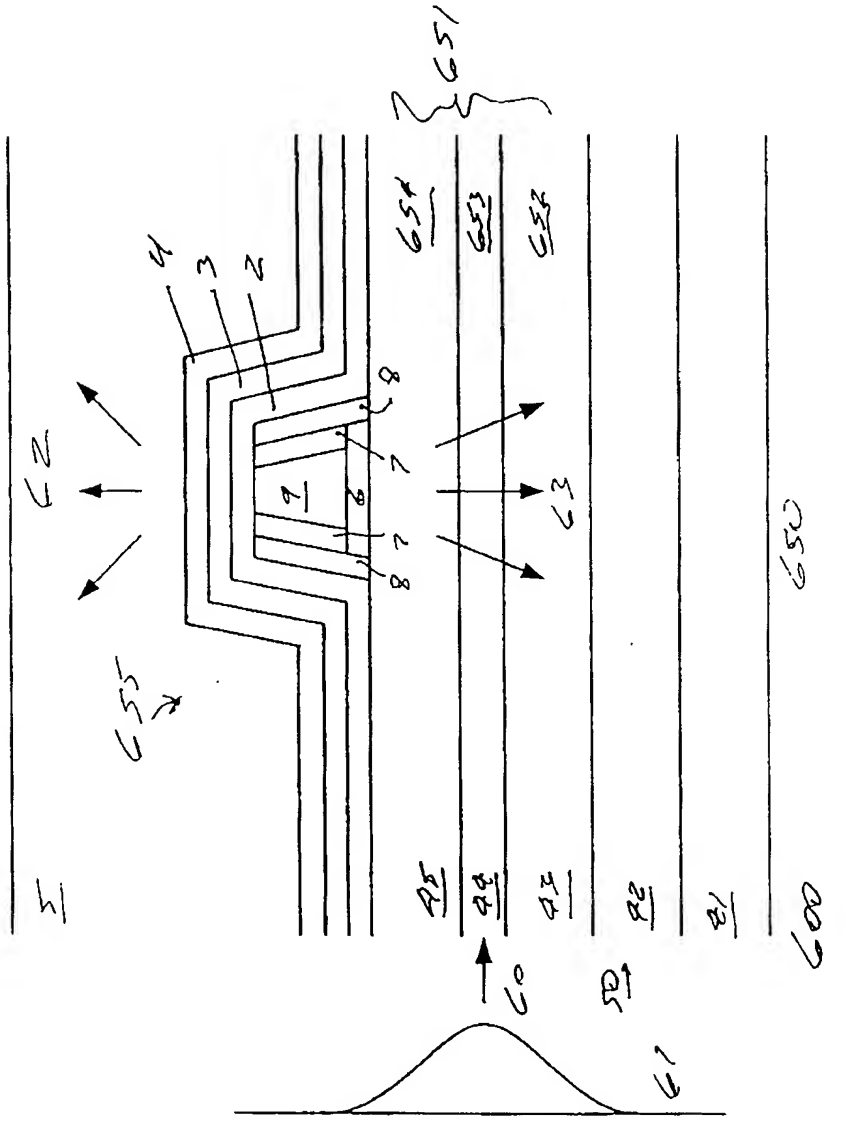

FIGURE 6

SIDE VIEW
SILICON STRIP LOADED WG ON DOUBLE LAYER
WITH POLY SCATTERING ELEMENT

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 6	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	653	Portion of core
Silicon (45)	161	Body of transistor	654	Portion of core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	6	Gate oxide	6	Part of cladding and light scattering element
Poly	9	Gate	9	"
SiO2	7	Sidewall passivation	7	"
SiO2	8	Part of gate spacer	8	"
SiO2	2	Oxide spacer	2	"
Si3N4	3	Salicide block	3	"
SiO2	4	Contact punch-through	4	"
SiO2	5	Inter-layer dielectric (ILD)	5	"

FIGURE 6A

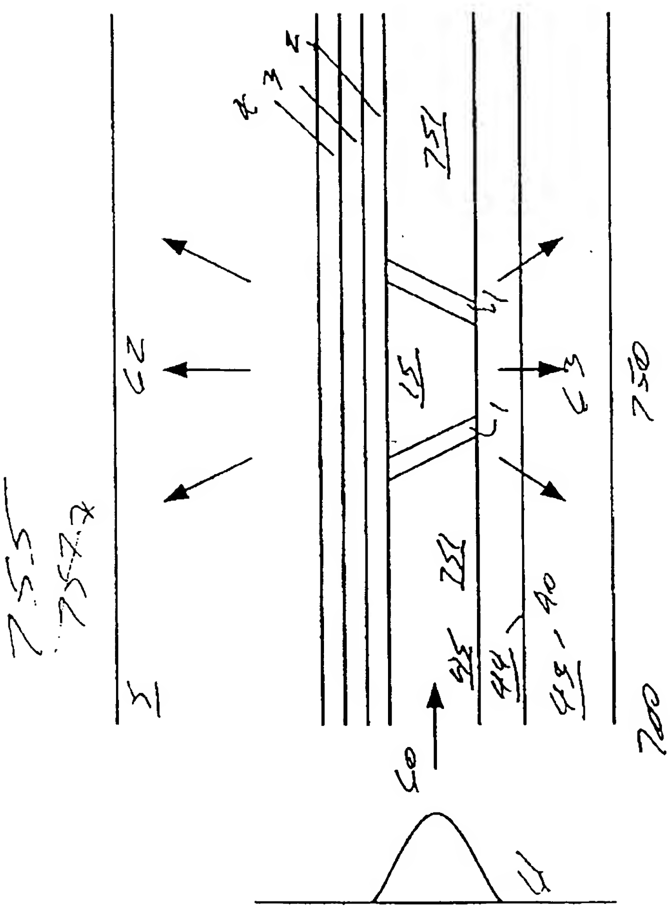

FIGURE 7

SIDE VIEW
SILICON WG ON SOI
WITH TRENCH IN SILICON

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 7	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	751	Core
SiO2	1	Sidewall passivation	1	Part of cladding and light scattering element
SiO2	15	Field oxide	15	"
SiO2	2	Oxide spacer	2	Cladding
Si3N4	3	Salicide block	3	Cladding
SiO2	4	Contact punch-through	4	Cladding
SiO2	5	Inter-layer dielectric (ILD)	5	Cladding

FIGURE 7A

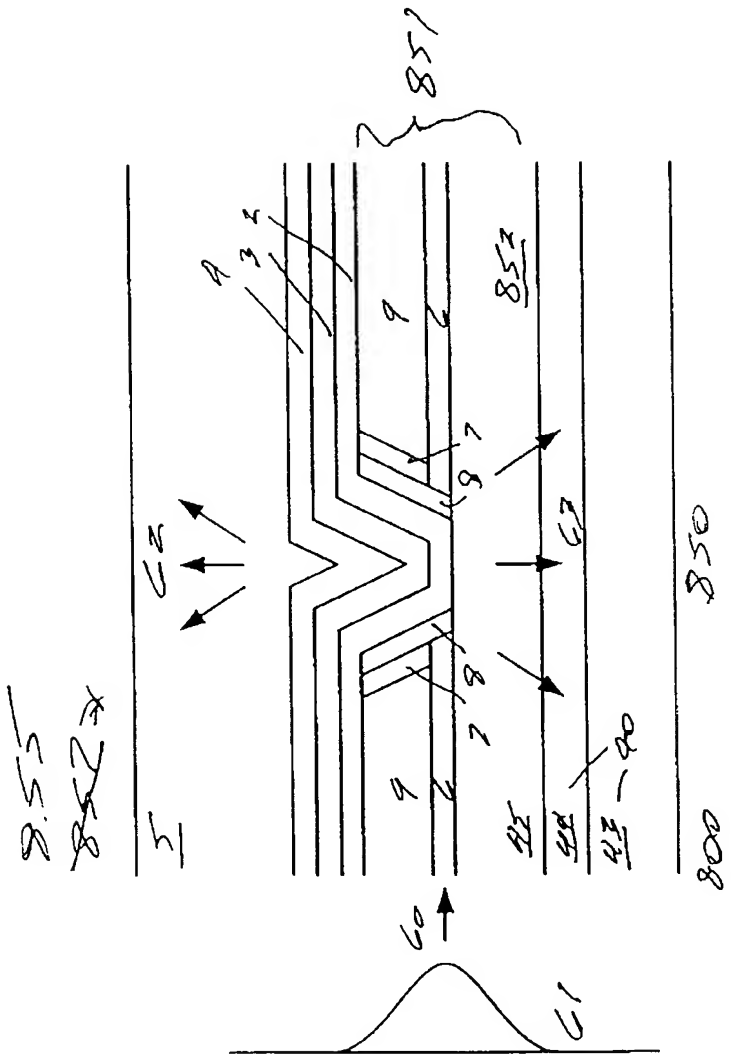

FIGURE 8

SIDE VIEW
POLY STRIP LOADED WG ON SOI
WITH TRENCH IN POLY STRIP

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 8	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	852	Portion of core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	6	Gate oxide	6	Portion of core
Poly	9	Gate	9	Portion of core
SiO2	7	Sidewall passivation	7	Part of cladding and light scattering element
SiO2	8	Part of gate spacer	8	"
SiO2	2	Oxide spacer	2	"
Si3N4	3	Salicide block	3	"
SiO2	4	Contact punch-through	4	"
SiO2	5	Inter-layer dielectric (ILD)	5	"

FIGURE 8A

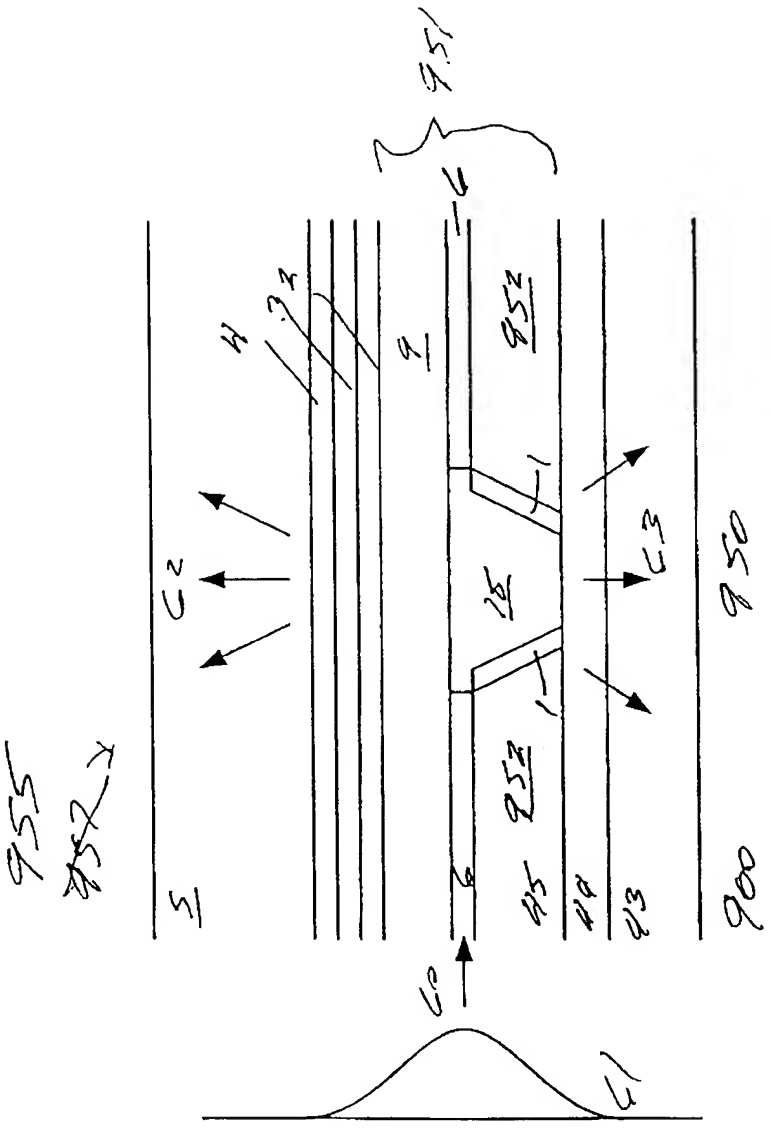

FIGURE 9

SIDE VIEW
POLY STRIP LOADED WG ON SOI
WITH TRENCH IN SILICON

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 9	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	952	Portion of core
SiO2	1	Sidewall passivation	1	Part of cladding and light scattering element
SiO2	15	Field oxide	15	"
SiO2	6	Gate oxide	6	Portion of core
Poly	9	Gate	9	Portion of core
SiO2	7	Sidewall passivation	7	Cladding
SiO2	8	Part of gate spacer	8	Cladding
SiO2	2	Oxide spacer	2	Cladding
Si3N4	3	Salicide block	3	Cladding
SiO2	4	Contact punch-through	4	Cladding
SiO2	5	Inter-layer dielectric (ILD)	5	Cladding

FIGURE 9A

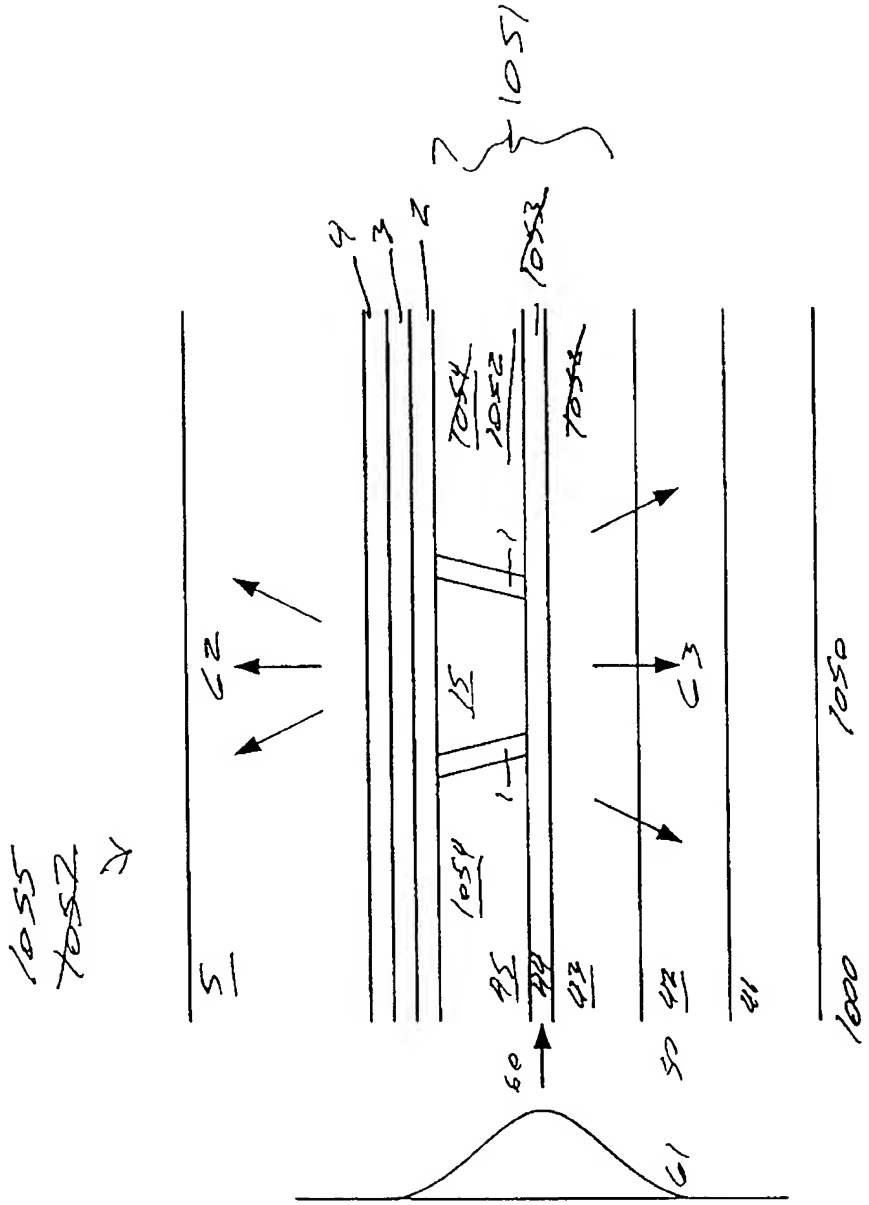

FIGURE 10

SIDE VIEW
SILICON STRIP LOADED WG ON DOUBLE LAYER
WITH TRENCH IN SILICON

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		WAVEGUIDE and LIGHT SCATTERING ELEMENT IN FIGURE 10	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	1053	Portion of core
Silicon (45)	161	Body of transistor	1054	Portion of core
SiO2	1	Sidewall passivation	1	Part of cladding and light scattering element
SiO2	15	Field oxide	15	"
SiO2	2	Oxide spacer	2	Cladding
Si3N4	3	Salicide block	3	Cladding
SiO2	4	Contact punch-through	4	Cladding
SiO2	5	Inter-layer dielectric (ILD)	5	Cladding

FIGURE 10A

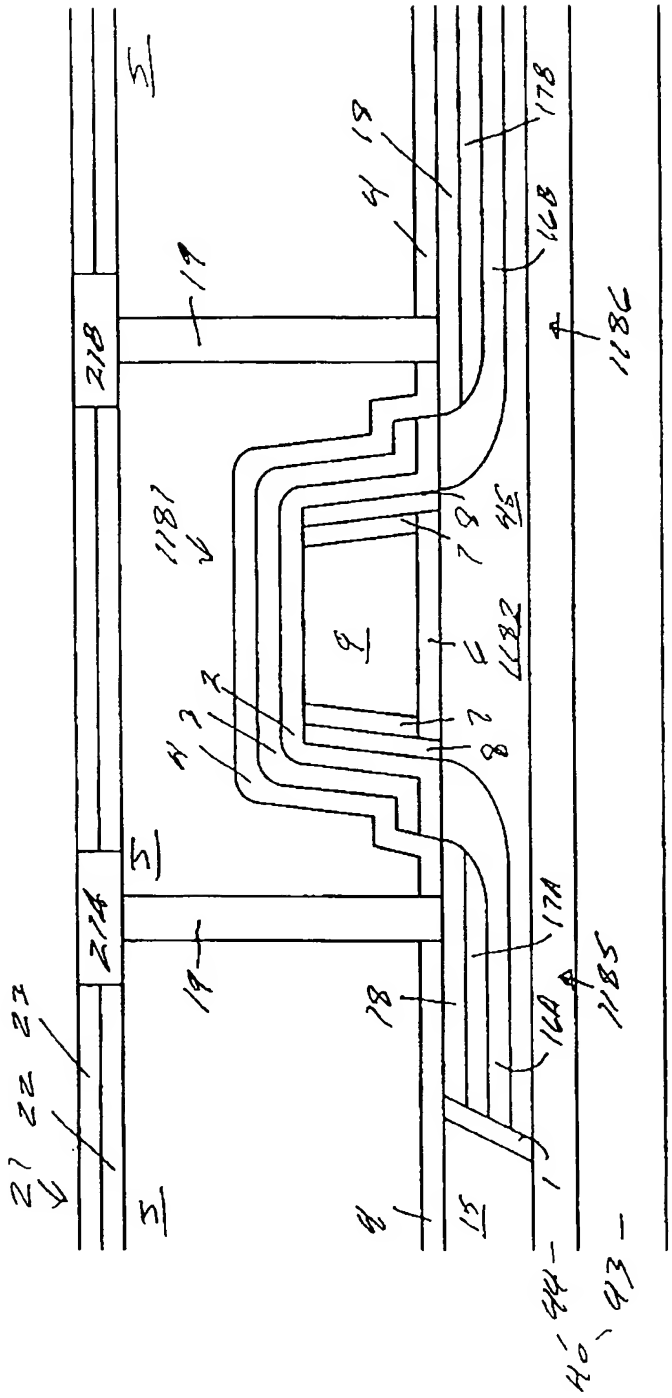

FIGURE 11

CROSS SECTIONAL VIEW
POLY STRIP LOADED ACTIVE WAVEGUIDE ON SOI

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		ACTIVE WAVEGUIDE IN FIG. 11	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Buried oxide	44	Cladding
Silicon (45)	161	Body of transistor	1182	Portion of core
Dopant	161	Well implant into body	1182	Implant into silicon of core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	6	Gate oxide	6	Portion of core
Poly	9	Gate	9	Portion of core
SiO2	7	Sidewall passivation	7	Cladding
SiO2	8	Part of gate spacer	8	Cladding
Dopant	16	Extension implants	16	Extension implants
SiO2	2	Oxide spacer	2	Cladding
Si3N4	3	Salicide block	3	Cladding
Dopant	17	S, D and G implants	17	S and D implants
Cobalt silicide	18	S, D and G contacts	18	S and D contacts
SiO2	4	Contact punch-through	4	Cladding
Tungsten	19	Conductive plugs	16	Conductive plugs
SiO2	5	Inter-layer dielectric (ILD)	5	Cladding

FIGURE 11A

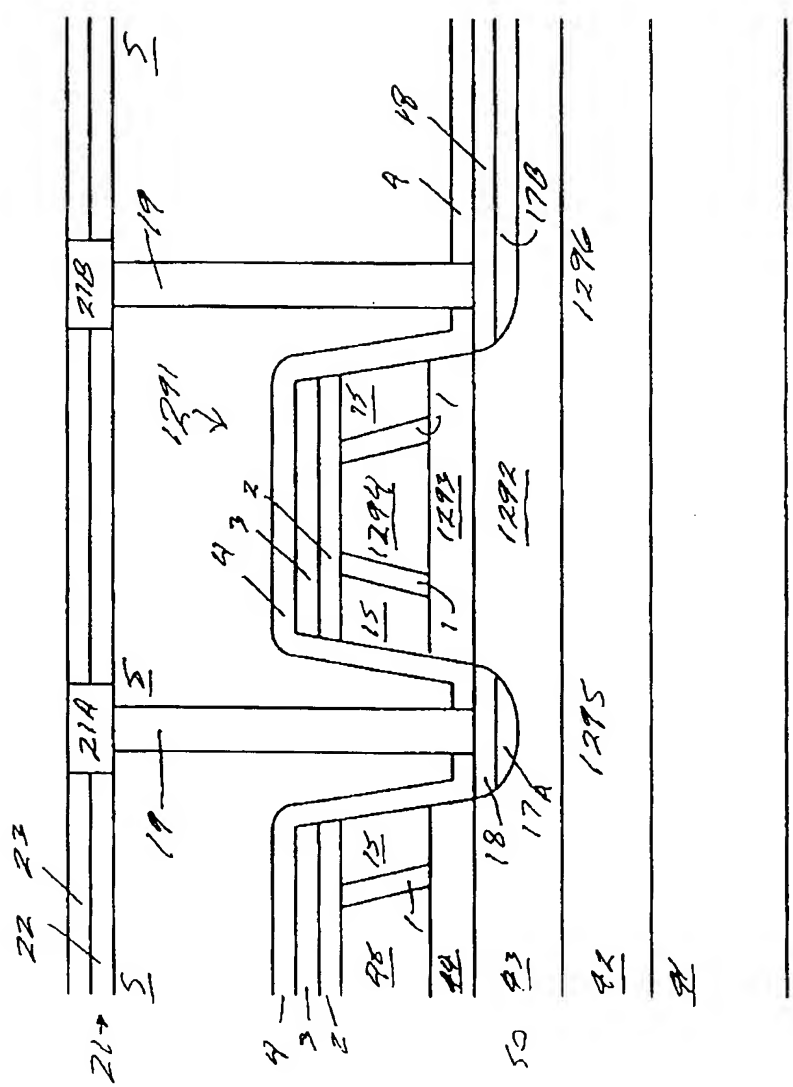

FIGURE 12

CROSS SECTIONAL VIEW
SILICON STRIP LOADED ACTIVE WAVEGUIDE
ON DOUBLE LAYER

ELEMENTS OF INTEGRATED COMPONENTS FORMED FROM THE SAME MATERIALS AT THE SAME TIME				
TYPICAL MATERIALS	CMOS TRANSISTOR IN FIG. 1		ACTIVE WAVEGUIDE IN FIG. 12	
	#	DESCRIPTION	#	DESCRIPTION
SiO2	44	Insulator	1293	Portion of core
Silicon (45)	161	Body of transistor	1294	Portion of core
Dopant	161	Well implant into body	1292	Implant into silicon of core
SiO2	1	Sidewall passivation	1	Cladding
SiO2	15	Field oxide	15	Cladding
SiO2	2	Oxide spacer	2	Cladding
Si3N4	3	Salicide block	3	Cladding
Dopant	17	S, D and G implants	17	S and D implants
Cobalt silicide	19	S, D and G contacts	18	S and D contacts
SiO2	4	Contact punch-through	4	Cladding
Tungsten	19	Conductive plugs	19	Conductive plugs
SiO2	5	Inter-layer dielectric (ILD)	5	Cladding

FIGURE 12A

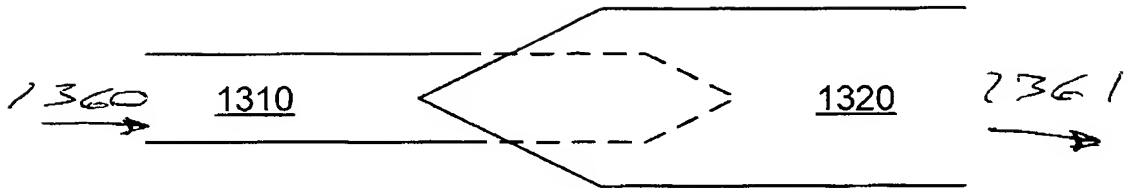

FIGURE 13

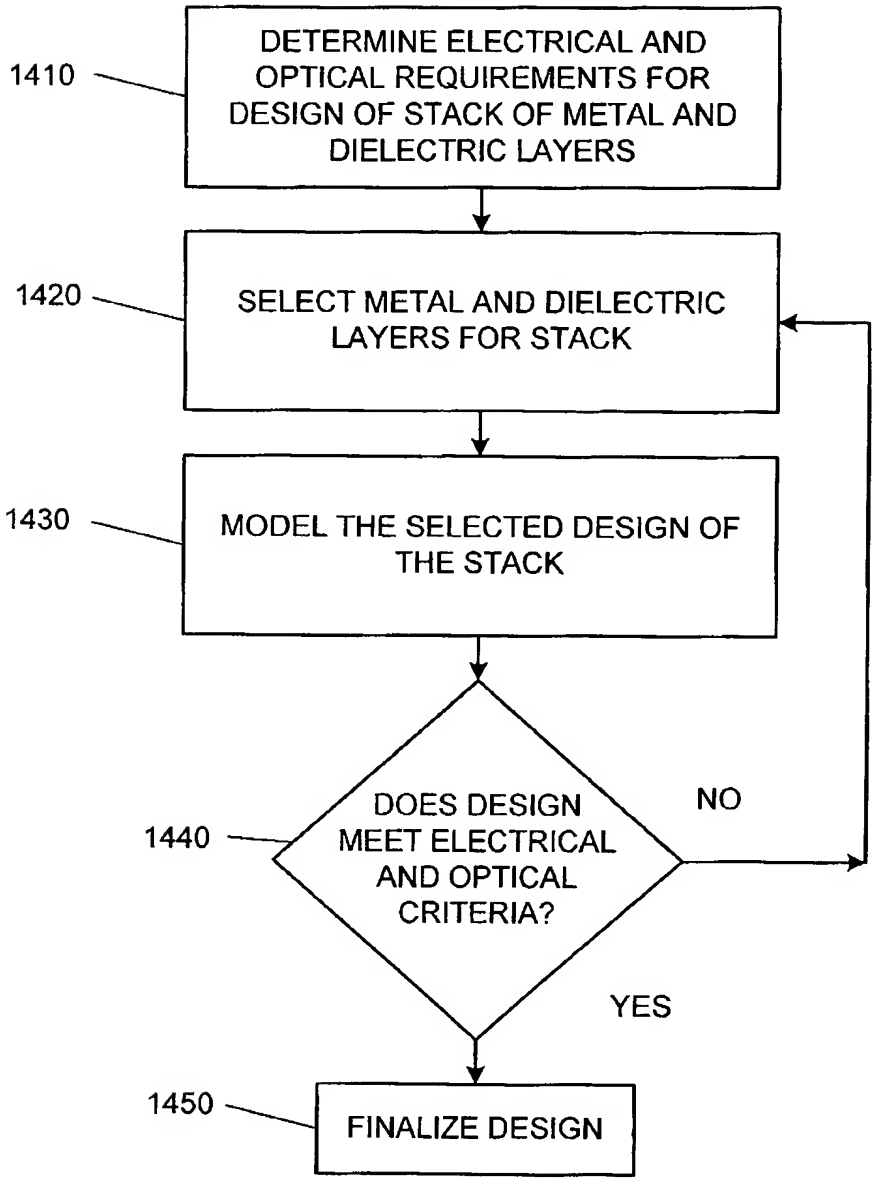
1410
DETERMINE ELECTRICAL AND OPTICAL REQUIREMENTS FOR DESIGN OF STACK OF METAL AND DIELECTRIC LAYERS
1420
SELECT METAL AND DIELECTRIC LAYERS FOR STACK
1430
MODEL THE SELECTED DESIGN OF THE STACK
1440
DOES DESIGN MEET ELECTRICAL AND OPTICAL CRITERIA?
NO
YES
1450
FINALIZE DESIGN

FIGURE 14